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EXAMINER
STEVENS, THOMAS H

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2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/500,293	WOLFE, ROBERT H.
	Examiner	Art Unit
	Thomas H. Stevens	2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 February 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-37 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-37 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-37 were examined.

Section I: Prosecution Reopened

2. In view of the appeal brief filed on, 2/14/05, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Reopening is necessitated based on applicants' argument in the brief. Based on applicants' brief and interpretation, examiner has provided new art and looks forward to advancing prosecution.

Section II: Non-Final Rejection (3rd Office Action)

Claim Interpretation

3. Office personnel are to give claims their **"broadest reasonable interpretation"** in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not

read into the claim. *In re Prater,* 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551(CCPA 1969). See *also *In re Zletz,* 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322(Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow") .... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed .... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.

This is based on examiner's interpretation of applicants' claim language provided in the broadest interpretation: figures 4a-d disclose a tracker with electronic device inserted; and figures 5a-e teach various jig types but both are integrated, separately, towards a CAD platform.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Azar (U.S. Patent 5,778,177 (1998)). Numbers within parenthesis represent component or steps found in Azar (1998). Azar teaches an interactive device which is to display and manipulate multidimensional images. Figure 2 shows one embodiment of the interactive scanning device and system (10) of the present invention. The interactive scanning device or system (10) includes one or more input devices (11), at least one scanner (12), an image processor (13), comprising of a computer processor (13a) and a

CAD storage (13b) for storage of any suitable solid modeling program, an image display (14), and communication interface (15). The input device (11) includes such things as a keyboard (11 a), a mouse (11 b), a touch screen (11 c), or any other device which enables the user of the present invention to interactively display and manipulate a three-dimensional image of an object or surface. (Column 2, lines 26-39)

The scanner (12) includes infrared, radio waves or laser scanning equipment. The scanner may compromise one or more single or multi-dimensional scanners. If only one scanner is used, the object will likely need to be rotated so that the scanner can capture the geometrical dimensions of the object or the topological information associated with more than one surface of the object. Alternatively, the object can remain partially or wholly fixed with the use of a plurality of scanners appropriately positioned around the object. (Column 2, lines 49-56)

In operation, the scanner (12) captures the geometrical dimensions of the object and the topological data associated with its surfaces. The data is then, if desired, stored in the device memory or in memory associated with the image processor (13). To ensure image integrity, after scanning, the image is preferably displayed on the image display (14) by way of the image processor (13) and then transmitted over the telecommunication medium (20) to another interactive scanning device (10) or computer station (5) using the same or similar solid modeling software program. At either location, the image can be interactively displayed and manipulated by the user. (Column 3, lines 19-29)

The image processor (13) may include using a CAD program (13b) or other solid modeling software package. The computer processor (13) can be of a variety of devices capable of processing the information obtained by scanning an object or surface, or both, in conjunction with a solid modeling program (e.g., microprocessor, personal computer, computer work station, etc.). (Column 2, lines 55-62)

The solid modeling software package (13b) allows interactive display and manipulation of the scanned objects or surface on the image display (14). The user can communicate about an object or surface and individually, as well as collectively, manipulate the image of the object in the form or rotation, cut and paste and the like. (Column 2, lines 57-67; Column 3, lines 1-5)

Claim 1: A CAD (computer-aided design) system, comprising: a data processing system comprising a CAD application, the CAD application (Azar: column 1, lines 18-20) being executed by the data processing system to generate a CAD model of a physical model, the CAD model comprising a plurality of CAD representations each corresponding to a component part of the physical model; and a tracking system for generating tracker data associated with a given component part, wherein the tracker data is processed by the data processing system to generate a CAD representation of the given component part and determine the position and orientation of the component part with respect to the physical model as the component part is placed in a desired position in the physical model: (Azar. column 2, lines 19-67).

Claim 2: The system of claim 1, (Azar: column 1, lines 18-20; Azar. column 2, lines 19-67) further comprising a library for storing CAD representations of component parts used for constructing the physical model: (Azar: column 2, lines 26-34).

Claim 3: The system of claim 2, wherein the tracking system comprises: a stationary tracker source (TS); and a sensor circuit embedded in the given component part for sensing the position of the given component part with respect to the TS and for generating the tracker data, wherein the sensor circuit stores a part identification (ID) code that is transmitted to the data

processing system for the CAD application to retrieve a CAD representation from the library based on the part ID code:(Azar. - Column 2, lines 49-67).

Claim 4: The system of claim 2, wherein the tracking system comprises: a stationary tracker source (TS); and a tracker free member (TFM) for sensing its position with respect to the TS and generating the tracker data, wherein the TFM comprises a docking mechanism for connecting the TFM to the given component part at a docking position on the given component part: (Azar- column 2, lines 10-67).

Claim 5: The system of claim 4, wherein the docking position is one of arbitrary and pre-determined: (Azar: column 2, lines 49-56).

Claim 6: The system of claim 4, wherein the docking mechanism of the TFM insertably engages a receptacle on the given component part: (Azar: column 2, lines 49-56).

Claim 7: The system of claim 6, wherein a part ID (identification) of the given component part is encoded by the shape of the receptacle, and wherein the docking mechanism of the TFM senses the shape of the receptacle to identify the part and send a signal to the data processing system to retrieve a CAD representation from the library based on the part ID: (Azar: column 2 and 3, lines 49-56 and 1-9 respectively).

Claim 8. The system of claim 6, wherein the given component part comprises a microchip having a part ID code, the microchip being electrically coupled to the docking mechanism of the TFM upon connection of the TFM to the given component part so as to transmit the part ID

to the data processing system to retrieve a CAD representation from the library based on the part ID: (Azar- columns 2 and 3, lines 57-59 and 19-24 respectively).

Claim 9: The system of claim 4, wherein the docking mechanism comprises one of a suction device and an adhesion device: (As- stated by Azar: column 2, lines 49-56).

Claim 10: The system of claim 4, further comprising a marking jig for measuring tracker data of relevant points of the given component part to generate a CAD representation of the given component part: (Azar- column 2, lines 49-56 and 57-60).

Claim 11: The system of claim 10, wherein the marking jig comprises a fixed reference point: (Azar- column 2, lines 49-64).

Claim 12. The system of claim 10, wherein the relevant points include at least one corner of the given component part: (Azar- column 2, lines 49-64).

Claim 13. The system of claim 10, wherein the relevant points include all corners of the given component part: (Azar: column 3, lines 49-64).

Claim 14. The system of claim 10, wherein the marking jig is configured for measuring tracker data associated with a radius of the given component part: (Azar: column 3, lines 49-64).

Claim 15. A method for generating a CAD (computer-aided design) model of a corresponding physical model comprising a plurality of component physical parts, the method comprising the

steps of generating, a CAD representation of a given component physical part based on relevant points of the component physical part; tracking coordinates of the relevant points of the CAD representation of the component physical part in relation to coordinates of the CAD model as the physical component part is placed in a desired position in the physical model; and adding the CAD representation of component physical part to the CAD model such that the CAD model comprises an ensemble of individual CAD representations of component physical parts: (Azar. column 2 and column 3 lines 19-29).

Claim 16. The method of claim 15, wherein the step of generating a CAD representation of the component physical part comprises the steps of. connecting a tracker free member (TFM) to the component physical part at a docking position on the component physical part; obtaining coordinate data for each of the relevant points of the component physical part; processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical part in relation to the TFM: (Azar- column 2; and column 3 lines 19-29).

Claim 17. The method of claim 16, further comprising the step of rendering an image of the component physical part attached to the TFM using the processed coordinate: (Azar- column 3 lines 30-36).

Claim 18. The method of claim 16, wherein the step of obtaining coordinate data for each of the relevant points of the component physical part comprises the steps of obtaining a part identification (ID) code associated with the component physical part; and retrieving pre-stored

geometry data and docking position data associated with the component physical part based on the part ID code: (Azar: column 2 lines 49-64).

Claim 19. The method of claim 18, wherein the step of obtaining a part ID code comprises the steps of insertably engaging a docking mechanism of the TFM with a docking receptacle of the component physical part; encoding the part ID based on a shape of the docking receptacle; sensing the shape of the docking receptacle; and transmitting a corresponding part ID from the TFM based on the sensed shape of the docking receptacle: (Azar: column 2 lines 10-65).

Claim 20. The method of claim 18, wherein the step of obtaining a part ID code comprises the steps of insertably engaging a docking mechanism of the TFM with a docking receptacle of the component physical part to operatively connect the docking mechanism to a microchip in the component physical part; retrieving the part ID from the microchip; and transmitting the retrieved part ID from the TFM: (Azar: column 2 lines 26-65).

Claim 21. The method of claim 16, wherein the step of obtaining coordinate data for each of the relevant points of the component physical part comprises the steps of obtaining pre-stored geometry data of the relevant points associated with the component physical part; measuring coordinates of a portion of the relevant points of the component part; comparing the measured coordinates with the pre-stored geometry data; computing the docking position of the TFM on the component physical part, if a match is found between the measured coordinates and the geometry data of corresponding relevant points; determining a remainder of the relevant points of the component physical model based on the computed docking position and geometry data: (Azar.- column 2 lines 10-65).

Claim 22. The method of claim 21, further comprising the steps of* rendering images of the component physical part each having an alternative docking position, if a match is not found between the measured coordinates and the geometry data; and selecting the image with a desired docking position: (Azar: column 1 lines 27-46).

Claim 23. The method of claim 16, wherein the step of obtaining coordinate data for each of the relevant points of the component physical part comprises the steps of. measuring the coordinates of successive relevant points of the component part; rendering an image of the component physical part, wherein the image is dynamically generated by connecting a line from a current measured point to a last measured point; and re-connecting the line from the current measured point to any previous measured point, if the rendering of the connection between the current measured point and last measured point is an incorrect depiction of the component physical part: (Azar.- column 2; and column 3 lines 19-29).

Claim 24. The method of claim 16, wherein the step of processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical part in relation to the TFM comprises the steps of computing coordinates of the docking position of the TFM on the component physical part; and transforming the coordinates of the relevant points to the coordinates of the TFM using the computed docking position: (Azar- column 2; and column 3 lines 49-65).

Claim 25. The method of claim 15, further comprising the step of refining the CAD representation before adding the CAD representation to the CAD model: (Azar: column 2, lines 60-64; and column 3, lines 19-29).

Claim 26. The method of claim 15, further comprising the step of storing the CAD representation of the component physical part in a CAD library: (Azar: figure 2).

Claim 27. A program storage device readable by a recognition machine, tangibly embodying a program of instructions executable by the machine to perform method steps for generating a CAD (computer-aided design) model of a corresponding physical model comprising a plurality of component physical parts, the method comprising the steps of generating a CAD representation of a given component physical part based on relevant points of the component physical part; tracking coordinates of the relevant points of the CAD representation of the component physical part in relation to coordinates of the CAD model as the physical component part is placed in a desired position in the physical model; and adding the CAD representation of component physical part to the CAD model such that the CAD model comprises an ensemble of individual CAD representations of component physical parts: (Azar: figures 1-2; and column 2, lines 24-41).

Claim 28. The program storage device of claim 27, wherein the instructions for performing the step of generating a CAD representation of the component physical part comprise instructions for performing the steps of obtaining coordinate data for each of the relevant points of the component physical part; processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical

part in relation to coordinates of a tracker free member (TFM) attached to the component physical part at a docking position on the component physical part: (Azar: column 2, lines 49-63).

Claim 29. The program storage device of claim 28, further comprising instructions for performing the step of rendering an image of the component physical part attached to the TFM using the processed coordinates: (Azar: column 2, lines 39-61).

Claim 30. The program storage device of claim 28, wherein the instructions for performing the step of obtaining coordinate data for each of the relevant points of the component physical part comprise instructions for performing the steps of receiving a part identification (ID) code associated with the component physical part; and retrieving pre-stored geometry data and docking position data associated with the component physical part based on the part ID code: (Azar: column 3, lines 19-29).

Claim 31. The program storage device of claim 30, wherein the part ID code is received from one of the TFM or by user input: (Azar - column 3, lines 19-29).

Claim 32. The program storage device of claim 28, wherein the step of obtaining coordinate data for each of the relevant points of the component physical part comprises the steps of obtaining pre-stored geometry data of the relevant points associated with the component physical part; receiving tracker data from the TFM comprising measured coordinates of a portion of the relevant points of the component part; comparing the measured coordinates with the pre-stored geometry data; computing the docking position of the TFM on the component

physical part, if a match is found between the measured coordinates and the geometry data of corresponding relevant points; determining a remainder of the relevant points of the component physical model based on the computed docking position and geometry data: (Azar.- columns 2 and 3, lines 49- 66 and 19-29 respectively).

Claim 33. The program storage device of claim 32, further comprising instructions for performing the steps of rendering images of the component physical part each having an alternative docking position, if a match is not found between the measured coordinates and the geometry data for a user to select the image with a desired docking position: (Azar: column 2, line; 49-66).

Claim 34. The program storage device of claim 28, wherein the instructions for performing the step of obtaining coordinate data for each of the relevant points of the component physical part comprise instructions for performing the steps of receiving tracker data from the TFM comprising measured coordinates of successive relevant points of the component part; rendering an image of the component physical part, wherein the image is dynamically generated by connecting a line from a current measured point to a last measured point; and re-connecting the line from the current measured point to any previous measured point, in response to a signal sent by the user: (Azar: columns 1, 2 and 3, lines 34-52, 49- 66 and 19-29 respectively).

Claim 35. The program storage device of claim 28, wherein the instructions for performing the step of processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical part in relation to the

TFM comprise instructions for performing the steps of computing coordinates of the docking position of the TFM on the component physical part; and transforming the coordinates of the relevant points to the coordinates of the TFM using the computed docking position: (Azar: columns 1, 2 and 3, lines 34-52, 49- 66 and 19-29 respectively).

Claim 36. The program storage device of claim 27, further comprising instructions for performing the step of refining the CAD representation before adding the CAD representation to the CAD model: (Azar- column 3, lines 19-29).

Claim 37. The program storage device of claim 27, further comprising instructions for performing the step of storing the CAD representation of the component physical part in a CAD library: (Azar. column 3, lines 19-29).

6. Claims 1-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Aish (U.S. Patent 4,275,449 (1981)). Aish teaches a collection of modeling elements having distinct forms and changeably interchangeable for assembly to one another (abstract).

Claim 1: A CAD (computer-aided design) system, (column 1, lines 28-39) comprising: a data processing (column 9, lines 1-4) system comprising a CAD application, the CAD application being executed by the data processing (column 9, lines 1-4) system to generate a CAD model of a physical model (column 4, lines 8-11), the CAD model comprising a plurality of CAD representations each corresponding to a component part of the physical model (column 4, lines 8-11); and a tracking system for generating tracker data associated with a given component part, wherein the tracker data is processed by the data processing (column 9, lines

1-4) system to generate a CAD representation of the given component part and determine the position and orientation of the component part with respect to the physical model (column 4, lines 8-11) as the component part is placed in a desired position in the physical model (column 4, lines 8-11;columns 5 and 6, lines 65-68, 1-9).

Claim 2: The system of claim 1, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9) further comprising a library (column 2, lines 10-16) for storing CAD representations of component parts used for constructing the physical model (column 4, lines 8-11).

Claim 3: The system of claim 2, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16) wherein the tracking system comprises: a stationary tracker source (TS); and a sensor circuit embedded in the given component part for sensing the position of the given component part with respect to the TS and for generating the tracker data, wherein the sensor circuit stores a part ID identification (ID) code that is transmitted to the data processing (column 9, lines 1-4) system for the CAD application to retrieve a CAD representation from the library (column 2, lines 10-16) based on the part ID code (column 6, lines 35-44).

Claim 4: The system of claim 2, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16) wherein the tracking system comprises: a stationary tracker source (TS); and a tracker free member (TFM) for sensing its position with respect to the TS and generating the tracker data, wherein the TFM comprises a docking mechanism for

connecting the TFM to the given component part at a docking position (column 3, lines 20-33) on the given component part.

Claim 5: The system of claim 4, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16) wherein the docking position is one of arbitrary and pre-determined

Claim 6: The system of claim 4, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16) wherein the docking mechanism of the TFM insertably engages a receptacle on the given component part (column 5, lines 6-9).

Claim 7: The system of claim 6, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16; column 5, lines 6-9) wherein a part ID Identification (column 1, lines 28-39) the given component part is encoded by the shape of the receptacle, and wherein the docking mechanism of the TFM senses the shape of the receptacle to ID identify (column 6, lines 43-44) the part and send a signal to the data processing (column 9, lines 1-4) system to retrieve a CAD representation from the library (column 2, lines 10-16) based on the part ID .

Claim 8. The system of claim 6, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16; column 5, lines 6-9) wherein the given component part comprises a microchip having a part ID code (column 6, lines 35-44), the microchip being electrically coupled to the docking mechanism of the TFM upon connection of the TFM to the given component part so as to transmit the part ID to the data processing (column 9, lines 1-4)

system to retrieve a CAD representation from the library (column 2, lines 10-16) based on the part ID.

Claim 9: The system of claim 4, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16) wherein the docking mechanism comprises one of a suction device and an adhesion device.

Claim 10: The system of claim 4, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16) further comprising a marking jig (column 3, line 28-31) for measuring tracker data of relevant points of the given component part to generate a CAD representation of the given component part.

Claim 11: The system of claim 10, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16; column 3, line 28-31) wherein the marking jig (column 3, line 28-31) comprises a fixed reference point.

Claim 12. The system of claim 10, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16; column 3, line 28-31) wherein the relevant points include at least one corner of the given component part.

Claim 13. The system of claim 10, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16; column 3, line 28-31) wherein the relevant points include all corners of the given component part.

Claim 14. The system of claim 10, (column 1, lines 28-39; column 9, lines 1-4; columns 5 and 6, lines 65-68, 1-9; column 2, lines 10-16; column 3, line 28-31) wherein the marking jig (column 3, line 28-31) is configured for measuring tracker data associated with a radius of the given component part.

Claim 15. A method for generating a CAD (computer-aided design) (column 1, lines 28-39) model of a corresponding physical model (column 4, lines 8-11) comprising a plurality of component physical part (column 4, lines 14-19) (column 4, lines 14-19), the method comprising the steps of generating, a CAD representation of a given component physical part (column 4, lines 14-19) based on relevant points of the component physical part (column 4, lines 14-19); tracking coordinates of the relevant points of the CAD representation of the component physical part (column 4, lines 14-19) in relation to coordinates of the CAD model as the physical component part is placed in a desired position in the physical model (column 4, lines 8-11); and adding the CAD representation of component physical part (column 4, lines 14-19) to the CAD model such that the CAD model comprises an ensemble of individual CAD representations of component physical parts (column 4, lines 14-19).

Claim 16. The method of claim 15, (column 1, lines 28-39; column 4, lines 8-11) wherein the step of generating a CAD representation of the component physical part (column 4, lines 14-19) comprises the steps of connecting a tracker free member (TFM) to the component physical part (column 4, lines 14-19) at a docking position on the component physical part (column 4, lines 14-19); obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19); processing the coordinate data (column 6, lines 30-45)

for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical part (column 4, lines 14-19) in relation to the TFM.

Claim 17. The method of claim 16, (column 1, lines 28-39; column 4, lines 8-11) further comprising the step of rendering an image of the component physical part (column 4, lines 14-19) attached to the TFM using the processed coordinate.

Claim 18. The method of claim 16, (column 1, lines 28-39; column 4, lines 8-11) wherein the step of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19) comprises the steps of obtaining a part ID identification (ID) code associated with the component physical part (column 4, lines 14-19); and retrieving pre-stored geometry data and docking position data associated with the component physical part (column 4, lines 14-19) based on the part ID.

Claim 19. The method of claim 18, (column 1, lines 28-39; column 4, lines 8-11; lines 14-19) wherein the step of obtaining a part ID code comprises the steps of insertably engaging a docking mechanism of the TFM with a docking receptacle of the component physical part (column 4, lines 14-19); encoding the part ID (column 4, lines 6, lines 35-40) based on a shape of the docking receptacle; sensing the shape of the docking receptacle (column 4, lines 6, lines 35-40); and transmitting a corresponding part ID (column 4, lines 6, lines 35-40) from the TFM based on the sensed shape of the docking receptacle

Claim 20. The method of claim 18, (column 1, lines 28-39; column 4, lines 8-11; lines 14-19) wherein the step of obtaining a part ID code comprises the steps of insertably engaging a

docking mechanism of the TFM with a docking receptacle of the component physical part (column 4, lines 14-19) to operatively connect the docking mechanism to a microchip in the component physical part (column 4, lines 14-19); retrieving the part ID from the microchip (column 6, lines 40-45); and transmitting the retrieved part ID from the TFM

Claim 21. The method of claim 16, (column 1, lines 28-39; column 4, lines 8-11) wherein the step of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19) comprises the steps of obtaining pre-stored geometry data of the relevant points associated with the component physical part (column 4, lines 14-19); measuring coordinates of a portion of the relevant points of the component part (column 6, lines 31-34); comparing the measured coordinates with the pre-stored geometry data (column 6, lines 40-42); computing the docking position of the TFM on the component physical part (column 4, lines 14-19), if a match is found between the measured coordinates and the geometry data of corresponding relevant points; determining a remainder of the relevant points of the component physical model (column 4, lines 8-11) based on the computed docking position and geometry data (column 1, lines 23-25; column 6, lines 29-45).

Claim 22. The method of claim 21, (column 1, lines 28-39; column 4, lines 8-11; column 6, lines 29-45; column 4, lines 14-19) further comprising the steps of: rendering images of the component physical part (column 4, lines 14-19) each having an alternative docking position, if a match is not found between the measured coordinates and the geometry data (column 6, lines 16-40); and selecting the image (column 5, lines 35-49) with a desired docking position.

Claim 23. The method of claim 16, (column 1, lines 28-39; column 4, lines 8-11) wherein the step of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19) comprises the steps of: measuring the coordinates of successive relevant points of the component part (column 4, lines 14-19); rendering an image of the component physical part (column 4, lines 14-19), wherein the image is dynamically generated by connecting a line from a current measured point to a last measured point (column 4, lines 14-19); and re-connecting the line from the current measured point to any previous measured point, if the rendering of the connection between the current measured point and last measured point is an incorrect depiction of the component physical part (column 4, lines 14-19).

Claim 24. The method of claim 16, wherein the step of processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical part (column 4, lines 14-19) in relation to the TFM comprises the steps of computing coordinates of the docking position of the TFM on the component physical part (column 4, lines 14-19); and transforming the coordinates of the relevant points to the coordinates (column 6, lines 25-44) of the TFM using the computed docking position.

Claim 25. The method of claim 15, (column 1, lines 28-39; column 4, lines 8-11) further comprising the step of refining the CAD representation before adding the CAD representation to the CAD model (column 1, 20-44).

Claim 26. The method of claim 15, (column 1, lines 28-39; column 4, lines 8-11) further comprising the step of storing the CAD representation of the component physical part (column 4, lines 14-19) in a CAD library (column 2, lines 10-16).

Claim 27. A program storage device (column 2, lines 10-16) (column 1, lines 28-39) readable by a recognition machine, tangibly embodying a program of instructions executable by the machine to perform method steps for generating a CAD (computer-aided design) model of a corresponding physical model (column 4, lines 8-11) comprising a plurality of component physical parts (column 4, lines 14-19), the method comprising the steps of generating a CAD representation of a given component physical part (column 4, lines 14-19) based on relevant points of the component physical part (column 4, lines 14-19); tracking coordinates of the relevant points of the CAD representation of the component physical part (column 4, lines 14-19) in relation to coordinates of the CAD model as the physical component part is placed in a desired position in the physical model (column 4, lines 8-11); and adding the CAD representation of component physical part (column 4, lines 14-19) to the CAD model such that the CAD model comprises an ensemble of individual CAD representations of component physical parts (column 4, lines 14-19).

Claim 28. The program storage device (column 2, lines 10-16) of claim 27, (column 1, lines 28-39; column 4, lines 8-11) wherein the instructions for performing the step of generating a CAD representation of the component physical part (column 4, lines 14-19) comprise instructions for performing the steps of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19); processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of

the component physical part (column 4, lines 14-19) in relation to coordinates of a tracker free member (TFM) attached to the component physical part (column 4, lines 14-19) at a docking position on the component physical part (column 4, lines 14-19).

Claim 29. The program storage device (column 2, lines 10-16) of claim 28, (column 1, lines 28-39; column 4, lines 8-11) further comprising instructions for performing the step of rendering an image of the component physical part (column 4, lines 14-19) attached to the TFM using the processed coordinates.

Claim 30. The program storage device (column 2, lines 10-16) of claim 28, (column 1, lines 28-39; column 4, lines 8-11) wherein the instructions for performing the step of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19) comprise instructions for performing the steps of receiving a part ID identification (ID) code associated with the component physical part (column 4, lines 14-19); and retrieving pre-stored geometry data and docking position data associated with the component physical part (column 4, lines 14-19) based on the part ID code.

Claim 31. The program storage device (column 2, lines 10-16) of claim 30, (column 1, lines 28-39; column 4, lines 8-11; column 4, lines 14-19wherein the part ID code is received from one of the TFM or by user input.

Claim 32. The program storage device (column 2, lines 10-16) of claim 28, (column 1, lines 28-39; column 4, lines 8-11) wherein the step of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19) comprises the steps of obtaining

pre-stored geometry data of the relevant points associated with the component physical part (column 4, lines 14-19); receiving tracker data from the TFM comprising measured coordinates of a portion of the relevant points of the component part (column 6, lines 30-45); comparing the measured coordinates with the pre-stored geometry data (column 6, lines 30-45); computing the docking position of the TFM on the component physical part (column 4, lines 14-19), if a match is found between the measured coordinates and the geometry data of corresponding relevant points; determining a remainder of the relevant points of the component physical model (column 4, lines 8-11) based on the computed docking position and geometry data.

Claim 33. The program storage device (column 2, lines 10-16) of claim 32, (column 1, lines 28-39; column 4, lines 8-11; column 6, lines 30-45; column 4, lines 14-19) further comprising instructions for performing the steps of rendering images of the component physical part (column 4, lines 14-19) each having an alternative docking position, if a match is not found between the measured coordinates (column 6, lines 30-45) and the geometry data for a user to select the image with a desired docking position.

Claim 34. The program storage device (column 2, lines 10-16) of claim 28, (column 1, lines 28-39; column 4, lines 8-11; column 6, lines 30-45; column 4, lines 14-19) wherein the instructions for performing the step of obtaining coordinate data for each of the relevant points of the component physical part (column 4, lines 14-19) comprise instructions for performing the steps of receiving tracker data from the TFM comprising measured coordinates of successive relevant points of the component part; rendering an image of the component physical part (column 4, lines 14-19), wherein the image is dynamically generated by connecting a line from a current measured point to a last measured point (column 6, lines 25-45); and re-connecting

the line from the current measured point to any previous measured point, in response to a signal sent by the user (column 6, lines 25-45).

Claim 35. The program storage device (column 2, lines 10-16) of claim 28, (column 1, lines 28-39; column 4, lines 8-11; column 6, lines 30-45; column 4, lines 14-19) wherein the instructions for performing the step of processing the coordinate data for each of the relevant points to determine the position and orientation of each of the relevant points of the component physical part (column 4, lines 14-19) in relation to the TFM comprise instructions for performing the steps of computing coordinates of the docking position of the TFM on the component physical part (column 4, lines 14-19); and transforming the coordinates of the relevant points to the coordinates of the TFM using the computed docking position.

Claim 36. The program storage device (column 2, lines 10-16) of claim 27, (column 1, lines 28-39; column 4, lines 8-11) further comprising instructions for performing the step of refining the CAD representation before adding the CAD representation to the CAD model (column 1, lines 28-44).

Claim 37. The program storage device (column 2, lines 10-16) of claim 27, (column 1, lines 28-39; column 4, lines 8-11) further comprising instructions for performing the step of storing the CAD representation of the component physical part (column 4, lines 14-19) in a CAD library (column 2, lines 10-16).

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Tom Stevens whose telephone number is 571-272-3715, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Leo Picard at (571) 272-3749. Fax number is 571-273-3715.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

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THS

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